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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,238	12/30/2004	Willem J. Quadakkers	2002P02127WOUS	5095

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Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

BALDWIN, GORDON

ART UNIT	PAPER NUMBER
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1775

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07/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/520,238	Applicant(s) QUADAKKERS ET AL.	
	Examiner Gordon R. Baldwin	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13, 15-17, 20, 24 and 28-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 15-17, 20, 24 and 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 31 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 does not require the titanium or scandium, which are required in claim 30, therefore claim 31 is considered to be indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13, 15-16, 19 and 20, are rejected under 35 U.S.C. 102(b) as being anticipated by Lau (U.S. Pub. No. 2002/0098294).

Consider claim 13, 15 and 16, Lau teaches a coating for turbine engines, with a primary and secondary coating. (Para. 007 and 008) A metal substrate is provided for with a an intermediate or primary layer containing a MCrAlY where the M is selected

from a group consisting of Fe, Ni and Co in addition to a secondary or outer layer containing cobalt, chromium, aluminum, yttrium and silicon which is considered to also be an MCrAlY layer with a range of aluminum of 18-55 atomic percent (approximately 11.3-34.5 wt. %) with 30 wt. % specifically being taught in paragraph 76. (Para. 007, 008 and 0011-0014) Lau also teaches that the second layer is thinner than the first coating layer with a second layer thickness of 35-85 micrometers. (Para. 0010)

Consider claim 19, Lau teaches that the primary layer has weight percentages within the claims taught by the applicant. (Para. 0073)

Consider claim 20, Lau teaches that the outer zone or secondary layer can contain the claimed amounts of silicon. (Para. 0076)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13, 15-16, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (Pub. Date 2002/0098294 A1).

Consider claim 13, Lau teaches a substrate, one forming a super-alloy material (Para. 006), with a two layered arrangement on top of the substrate. (Para. 0007-0008)

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The first layer (or primary layer) is taught to comprise an alloy of the formula MCrAlY, where M is selected from the group consisting of Fe, Ni, Co. (Para. 0007) and the secondary layer, that goes over the primary layer, comprises Nickel, Cobalt and Chromium with 30 wt % of Aluminum. (Para. 0076) While the secondary layer of Lau does not exactly teach the percentage of the applicant the only difference between the applicant and Lau is that Lau does not teach the exact same proportions as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to be obvious, because the compositional proportions taught by Lau overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Additionally, Lau teaches that the secondary layer is in the beta phase of NiAl (Para. 0024) and Lau teaches that the primary or intermediate layer has a greater

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thickness that the outer or secondary layer with a second layer thickness of 35-85 micrometers. (Claims 20 and 21 and Para. 0010)

Consider claim 15, Lau teaches the use of two separate layer in the protective layer structure. (Para. 0007 and 0008)

Consider claim 16, Lau teaches that the coatings are to be used in turbine engine components. (Para. 0006)

Consider claim 19, Lau teaches that the primary layer can have amounts of Co, Cr, Al, Y and Ni within the percentages taught by the applicant. (Para. 0020) It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges.

Consider claim 20, Lau teaches that the outer or secondary layer can contain the amount of claimed silicon. (Para. 0016)

Claims 17, 24, 28, 29 and 30-32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (Pub. Date 2002/0098294 A1) in further view of Dardi (U.S. Pat. No. 4,615,864)

Consider claim 17, Lau teaches the claimed invention of claim 13 except that Lau does not specifically teach a graded composition of the protective layers. However, Dardi teaches the use of a two layered MCrAlY graded coatings, which can offer good oxidation and /or sulfidation and thermal fatigue resistance for the substrate to which it is applied. (Col. 5 lines 1-20; abstract) It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the two protective layers

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taught by Lau to be graded, as taught in Dardi, to increase the substrate's ability to resist thermal fatigue by providing good oxidation and/or sulfidation. (Dardi, Abstract)

Consider claims 24 and 28, Lau teaches the claimed invention in claim 13.

However, Lau does not teach the use of elements from the group of Hf, Zr, La or Ce nor does Lau teach the addition of titanium.

Dardi teaches a two layer MCrAlY coating composition for iron-, nickel and cobalt based super alloys that can contain aluminum in a range of 3-15% (by weight) with 10-50% chromium and a balance of Ni, Co or Fe along with the addition of Ti or titanium oxide up to 5%. (Col. 3 lines 25-55 and Col. 5 lines 4-15) Dardi also teaches the use of up to 5% of hafnium can be used as well as 0-5% (by weight) of reactive metals from the group consisting of lanthanum, yttrium and other rare earth metals, since the addition of lanthanum, hafnium or titanium can be beneficial to reduce the metal operating temperature and the effects of thermal transients in the gas turbine engine. (Col. 5 lines 1-15)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have a two-layer protective coating with the composition of the two protective layers taught by Lau in combination with the compositions of the two MCrAlY layers, including the additions of Hf or La with Ti, of Dardi to reduce the metal (substrate) operating temperature and the effects of thermal transients in the gas turbine engine. (Col. 3 lines 45-53; Col. 5 lines 1-15 Dardi)

Consider claim 29, The heat treatment prior to applying the thermal barrier coating in a low oxygen pressure range is considered to be a product-by-process and

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even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process., (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (*In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Consider claims 30 and 32, Lau teaches a coating for turbine engines, with a primary and secondary coating. (Para. 007 and 008) A metal substrate is provided with an intermediate or primary layer containing a MCrAlY where the M is selected from a group consisting of Fe, Ni and Co in addition to a secondary or outer layer containing cobalt, chromium, aluminum, yttrium and silicon which is considered to also be an MCrAlY layer with a range of aluminum of 18-55 atomic percent (approximately 11.3-34.5 wt. %) with 30 wt. % specifically being taught in paragraph 76. (Para. 007, 008 and 0011-0014) Lau also teaches that the second layer is thinner than the first coating layer. (Para. 0010)

However, Lau does not teach the ranges of aluminum taught by the applicant for the MCrAlY layers, nor does Lau teach the addition of titanium to the MCrAlY layers.

Dardi teaches a two layer MCrAlY coating composition for iron-, nickel and cobalt based super alloys that can contain aluminum in a range of 3-15% (by weight) with 10-50% chromium and a balance of Ni, Co or Fe along with the addition of Ti or titanium oxide up to 5%. (Col. 3 lines 25-55 and Col. 5 lines 4-15) The use of titanium oxide in an amount between 0.05% to 2.0% by weight can be beneficial to the overall protective response of the coating because the metal oxide particles assist in pinning protective oxide scales, which results in superior adherence (less spalling) of the protective scale, thus increasing the life of the coating. (Col. 3 lines 39-53)

Dardi also teaches that this composition can make up both the inner coat and the bond coat to form a two-layered (graded) thermal barrier coating (with the thermal barrier coating being layer upon the secondary layer). (Col. 5 lines 7-12) As for the gamma-nickel matrix, of claim 30, Dardi teaches that the coatings (considered to include the outer coating) contain the presence of a ductile matrix of gamma (Ni) in a beta NiAl intermetallic. (Col. 7 lines 17-31)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have a two-layer protective coating with the composition of the two protective layers taught by Lau in combination with the compositions of the two MCrAlY layers, including the addition of Ti, of Dardi to assist in pinning protective oxide scales, which results in superior adherence (less spalling) of the protective scale, thus increasing the life of the coating. (Col. 3 lines 39-53)

Consider claim 31, Dardi teaches a two layer MCrAlY coating composition for iron-, nickel and cobalt based super alloys that can contain aluminum in a range of 3-

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15% (by weight) with 10-50% chromium, 3-35%% cobalt and a balance of Ni or Fe.

(Col. 4 lines 5-18) Dardi also teaches that the coating thicknesses can be in a range of 2.54 micrometers to 101 micrometers and possibly up to 2540 micrometers. (Col. 7 lines 17-31)

Consider claim 32, Dardi teaches the use of lanthanum to substitute yttrium in the MCrAlY coatings in table one in a range of 0.5-1.0%. (Table 1)

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lau (Pub. Date 2002/0098294 A1) in further view of Khan (Pub. No. 2002/0187336 A1).

Consider claim 24, Lau teaches the oxidation resistant coatings except for the use of Hf, Zr, La, Ce or other Lanthanide group members. However, Khan teaches that its coatings (Para 0020) for turbine engine components can contain Zr and/or Hf, with Zr being in a range of 0-0.5%, because the additions of Hf or Zr around 1 wt% increases the oxidation resistance of the protective layers, which would lead to better longevity for the protective coatings. (Khan Para.0015 and 0019)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the constituents of the coatings of Lau with the constituents of the coating of Khan because the additions of Hf or Zr around 1 wt% would increase the oxidation resistance of the protective layers, which would lead to better longevity for the protective coatings. (Khan Para. 0019)

Response to Arguments

Applicant's arguments filed 4/25/2007 have been fully considered but they are not persuasive. As for the Lau rejection under 35 U.S.C. 102(b), in paragraph 24 of Lau, the secondary layer is considered to be the outer layer and since no range of Cr is claimed by the applicant in claim 13 then the amount taught in Lau is considered to be consistent with claim 13. Additionally, the only claim that claims a specific amount of Cr is claim 31, which depends from claim 30, and the range taught by Lau overlaps the range claimed by the applicant. (Lau, Para. 0025-0027) There is no sufficient explanation for why the levels of chromium taught by Lau would cause the developments of alternate phases, especially since Lau teaches the making of the beta NiAl microstructure.

As for the thickness of the intermediate and secondary layer, since the teaching of Lau substantially overlaps the claimed thickness of the secondary layer it is considered to anticipate the claimed range. Prior art which teaches a range within, overlapping, or touching the claimed range anticipates if the prior art range discloses the claimed range with sufficient specificity. See MPEP 2131.03 and Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). As for the argument against the optimization of the thickness of the outer layer, since the thickness of the layers substantially overlap the claimed range and since brittleness versus oxidation and

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corrosion protection all go toward the strength and quality of the layer, then optimization of that layer for quality is considered appropriate.

Regarding claim 28, the Dardi reference has been applied to this rejection.

Please see the rejection above for an explanation.

As for the 35 U.S.C. 112 rejection of claims 30-32, this rejection is withdrawn due to further analysis of the claims, they are deemed to be proper.

As for the rejection of claim 24, it is still rejected under Khan and Dardi, the amounts claimed by the applicant are considered to be effective.

Regarding the rejection of claim 29, since claim 28 now has the limitation of Ti, Khan is no longer applicable. However, claim 29 is still rejected under 35 U.S.C. 103(a) with Lau in view of Dardi.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon R. Baldwin whose telephone number is (571)272-5166. The examiner can normally be reached on M-F 7:45-5:15.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GRB


JENNIFER C. MCNEIL
SUPERVISORY PATENT EXAMINER
4/9/4